

7.6 Branching controller installation guide for cooling/heating free multi installations

Indoor units are the same with those of Inverter Multi specifications.

Please lay refrigerant piping, electrical cables (including signal wires) and operate units according to this installation guide, indoor and outdoor unit installation manuals.

Precautions for safety

- Read the "SAFETY PRECAUTIONS" carefully first of all and then strictly follow it during the installation work in order to protect yourself.
- The precautionary items mentioned below are distinguished into two levels, **⚠ WARNING** and **⚠ CAUTION**.
⚠ WARNING: Wrong installation would cause serious consequences such as injuries or death.
⚠ CAUTION: Wrong installation might cause serious consequences depending on circumstances.
 Both mentions the important items to protect your health and safety so strictly follow them by any means.
- After completing the installation, do commissioning to confirm there are no abnormalities, and explain to the customers about "SAFETY PRECAUTIONS", correct operation method and maintenance method (air filter cleaning, operation method and temperature setting method) with user's manual of this unit.
 Ask your customers to keep this installation manual together with the user's manual. Also, ask them to hand over the user's manual to the new user when the owner is changed.

⚠ WARNING	⚠ CAUTION
<ul style="list-style-type: none"> ● Installation should be performed by the specialist. If you install the unit by yourself, it may lead to serious trouble such as water leakage, electric shock, fire, and injury due to overturn of the unit.  ● Install the system correctly according to these installation manuals. Improper installation may cause explosion, injury, water leakage, electric shock, and fire.  ● Consider measurement not to exceed the limit of the density of refrigerant in the event of leakage especially when it is installed in a small room. Consult the specialist about the measure. If the density of refrigerant exceeds the limit in the event of the leakage, serious accidents may occur due to lack of oxygen.  ● Use the genuine accessories and the specified parts for installation. If parts unspecified by our company are used it could cause water leakage, electric shock, fire, and injury due to overturn of the unit.  ● Ventilate the working area well in case the refrigerant leaks during installation. If the refrigerant contacts the fire, toxic gas is produced.  ● Install the unit in a location that can hold heavy weight. Improper installation may cause the unit to fall leading to accidents.  ● Install the unit properly in order to be able to withstand strong winds such as typhoons, and earthquakes. Improper installation may cause the unit to fall leading to accidents.  ● Do not mix air in to the cooling cycle on installation or removal of the air conditioner. If air is mixed in, the pressure in the cooling cycle will rise abnormally and may cause explosion and injuries.  ● Be sure to have the electrical wiring work done by qualified electrical installer, and use exclusive circuit. Power source with insufficient capacity and improper work can cause electric shock and fire.  ● Use specified wire for electrical wiring, fasten the wiring to the terminal securely, and hold the cable securely in order not to apply unexpected stress on the terminal. Loose connections or hold could result in abnormal heat generation or fire.  ● Check for refrigerant gas leakage after installation is completed. If the refrigerant gas leaks into the house and comes in contact with a fan heater, a stove, or an oven, toxic gas is produced.  ● Use the specified pipe, flare nut, and tools for R410A. Using existing parts (R22) could cause the unit failure and serious accident due to explosion of the cooling cycle.  ● Tighten the flare nut according to the specified method by with torque wrench. If the flare nut were tightened with excess torque, it could cause burst and refrigerant leakage after a long period.  ● Connect the pipes for refrigeration circuit securely in installation work before compressor is operated. If the compressor is operated when the service valve is open without connecting the pipe, it could cause explosion and injuries due to abnormal high pressure in the system.  ● Stop the compressor before removing the pipe on pump down work. If the pipe is removed when the compressor is in operation with the service valve open, air would be mixed in the refrigeration circuit and it could cause explosion and injuries due to abnormal high pressure in the cooling cycle.  ● Use the genuine optional parts. And installation should be performed by a specialist. If you install the unit by yourself, it could cause water leakage, electric shock and fire.  ● Do not repair by yourself. And consult with the dealer about repair. Improper repair may cause water leakage, electric shock or fire.  ● Consult the dealer or a specialist about removal of the air conditioner. Improper installation may cause water leakage, electric shock or fire.  ● Turn off the power source during servicing or inspection work. If the power is supplied during servicing or inspection work, it could cause electric shock and injury by the operating fan.  ● Do not run the unit when the panel or protection guard are taken off. Touching the rotating equipment, hot surface, or high voltage section could cause an injury to be caught in the machine, to get burned, or electric shock. ● Shut off the power before electrical wiring work. It could cause electric shock, unit failure and improper running. 	<ul style="list-style-type: none"> ● Perform earth wiring surely. Do not connect the earth wiring to the gas pipe, water pipe, lightning rod and telephone earth wiring. Improper earth could cause unit failure and electric shock due to a short circuit. Never connect the grounding wire to a gas pipe because if gas leaks, it could cause explosion or ignition.  ● Do not install the indoor unit near the location where there is possibility of flammable gas leakages. If the gas leaks and gathers around the unit, it could cause fire.  ● Do not install and use the unit where corrosive gas (such as sulfurous acid gas etc.) or flammable gas (such as thinner, petroleum etc.) may be generated or accumulated, or volatile flammable substances are handled. It could cause the corrosion of heat exchanger, breakage of plastic parts etc. And inflammable gas could cause fire.  ● Do not use the indoor unit at the place where water splashes such as laundry. Indoor unit is not waterproof. It could cause electric shock and fire.  ● Do not use the indoor unit for a special purpose such as food storage, cooling for precision instrument, preservation of animals, plants, and a work of art. It could cause the damage of the items.  ● Do not install nor use the system near equipments which generate electromagnetic wave or high harmonics. Equipments like inverter equipment, private power generator, high-frequency medical equipment, or telecommunication equipment might influence the air conditioner and cause a malfunction breakdown. Or the air conditioner might influence medical equipments or telecommunication equipments, and obstruct their medical activity or cause jamming.  ● Do not install the indoor unit at the place listed below. <ul style="list-style-type: none"> - Places where flammable gas could leak. - Places where carbon fiber, metal powder or any powder is floated. - Place where the substances which affect the air conditioner are generated such as sulfide gas, chloride gas, acid or alkali. - Places exposed to oil mist or steam directly. - On vehicles and ships - Places where machinery which generates high harmonics is used. - Places where cosmetics or special sprays are frequently used. - Highly salted area such as beach. - Heavy snow area - Places where the system is affected by smoke from a chimney. - Altitude over 1000m  ● Do not use the base frame for the outdoor unit which is corroded or damaged after a long period of use. It could cause the unit falling down and injury.  ● Pay attention not to damage the drain pan by weld sputter when brazing work is done near the unit. If sputter entered into the unit during brazing work, it could cause damage (pinhole) of drain pan and leakage of water. To avoid damaging, keep the indoor unit packed or cover the indoor unit.  ● Ensure the insulation on the pipes for refrigeration circuit so as not to condense water. Incomplete insulation could cause condensation and it would wet ceiling, floor, and any other valuables.  ● Pay extra attention, carrying the unit by hand. Carry the unit with 2 people if it is heavier than 20kg. Do not use the plastic straps but the grabbing place, moving the unit by hand. Use protective gloves in order to avoid injury by the aluminum fin.  ● Make sure to dispose of the packaging material. Leaving the materials may cause injury as metals like nail and woods are used in the package.  ● Do not touch the refrigerant piping with bare hands when in operation. The pipe during operation would become very hot or cold according to the operating condition, and it could cause a burn or frostbite.  ● Do not clean up the air conditioner with water. It could cause electric shock.  ● Do not turn off the power source immediately after stopping the operation. Be sure to wait for more than 5 minutes. Otherwise it could cause water leakage or breakdown. 

(a) Branching controller

PCB012D025

1. BEFORE BEGINNING INSTALLATION

- ① Limitation on the number of branching controllers which can be connected to a outdoor unit is as follows.

Outdoor unit	Minimum number of units to be able to connect
~280	2 units
~560	4 units
~850	6 units
~1130	8 units
~1360	10 units

※For PFD112X4-E model, calculate the number of units taking 1 branching controller as 4 controllers in this limit.

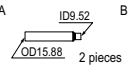
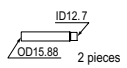




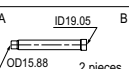
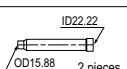
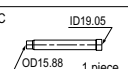
- ② The combined total capacity and the number of indoor units connected in the downstream of a branching controller are subject to restrictions depicted in the table below.

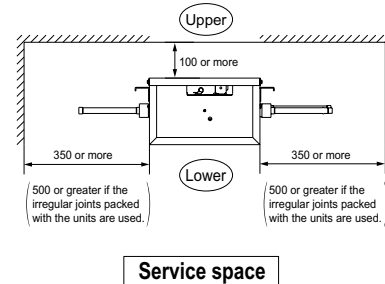
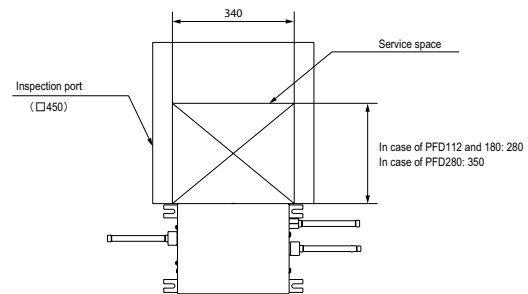
Branching controller model type	Total capacity downstream	Number of connectable units
PFD1123-E	Less than 112	1~5
PFD1803-E	112 or more but less than 180	1~8
PFD2803-E	180 or more but 280 or less	1~10

※When installing more than one indoor unit at the downstream from a branching controller, set it such a manner that all of them will be operated in the same cooling/heating mode, by either one of the following methods.

- Control of more than one indoor unit with one remote control unit ○ Same cooling/heating control in master/slave indoor unit (Refer to the installation manual of outdoor unit.)

- ③ Make sure that no accessory is missing.

Branching controller model type	Different diameter pipe joint				Heat insulation material	Relay kit
	For outdoor unit gas suction pipe	For indoor unit gas pipe	For outdoor unit gas discharge pipe			
PFD112	A  2 pieces	B  2 pieces	C  1 piece	D  1 piece	 3 pieces	
PFD180	None	None	None			
PFD280	A  2 pieces	B  2 pieces	C  1 piece			



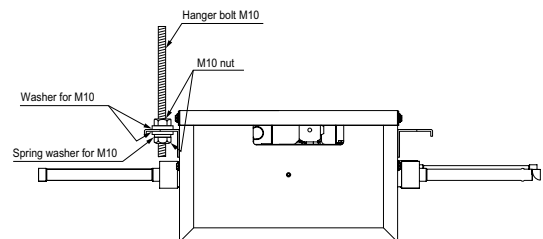
2. INSTALLATION OF A BRANCHING CONTROLLER

Selecting the installation location

- A branching controller sometimes generates noises during control operations whether the system is in operation or stands still. When it is installed in a place with a low background noise level, please take appropriate precautions such as installing it away from the indoor unit.
- The position where you can install refrigerant pipes within the specified restrictions on length.
- The position where you can install hanger bolts and secure a required level of strength. (The position where pulling force of 20 kg per bolt is endured)
- The position where a service space conforming to the requirements shown in the drawing on the right can be secured.

PLEASE NOTE

- (1) Do not fail to provide an inspection port at the specified position.
- (2) In fastening on the hanger bolts, use a bracket and fasten at the four points as illustrated in the drawing on the right.
- (3) A branching controller cannot be installed upside down. Please install it in such a manner that the main body remains level.



3. REFRIGERANT PIPING

- A branching controller has on its main body beneath the connection ports such indications as "S.G (OUT)," "D.G (OUT)" and "G (IN)" provided for the outdoor unit gas suction pipe, the outdoor unit gas discharge pipe and indoor unit gas pipes respectively, so please make sure that you connect correct pipes to correct ports.
- No liquid pipe needs to be connected to a branching controller.
- A unit must not be operated or left for a long time without completing the connection of individual branching controllers and indoor units.
- Pipes are to be brazed to connect to a branching controller.
- When brazing work, perform it while cool down around the brazing port with wet towels to prevent the overheating.
- After check the gas leak test, install the heat insulation (prepare on site) to the brazing port of the indoor unit.

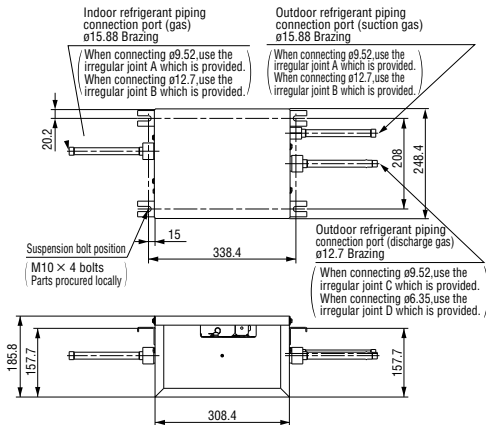
① Pipe connection.

When the diameter of the pipe on a branching controller is different from that of the connection pipe, use a different-diameter pipe joint supplied as an accessory.

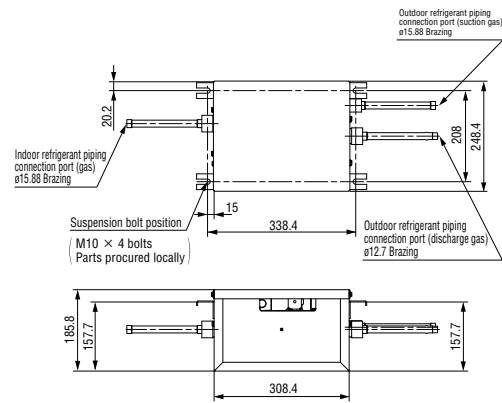
① Pipe connection.

When the diameter of the pipe on a branching controller is different from that of the connection pipe, use a different-diameter pipe joint supplied as an accessory.

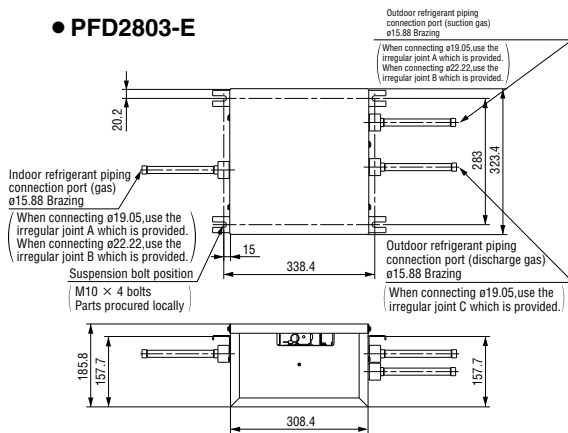
● PFD1123-E



● PFD1803-E

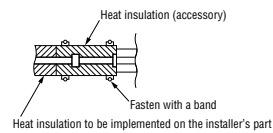


● PFD2803-E



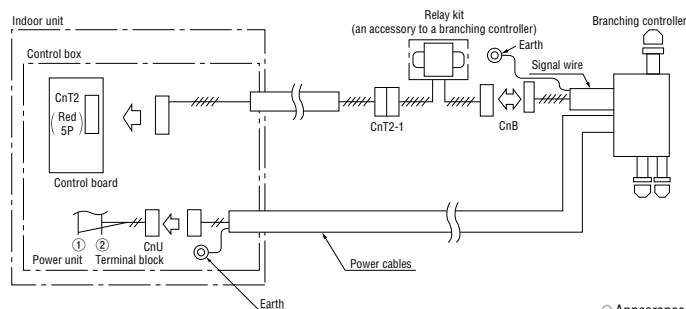
② Heat insulation of pipes

Do not fail to dress with a pipe cover supplied as an accessory for heat insulation.



4. ELECTRICAL WIRING WORK

Please implement cabling according to the instructions contained in the drawing below.



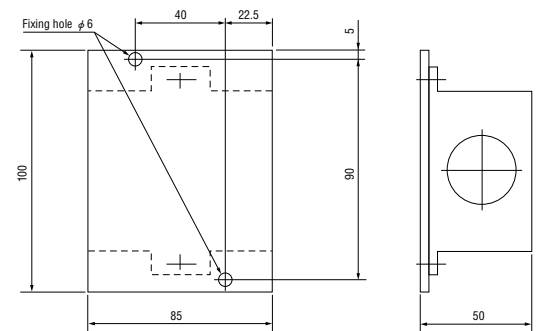
PLEASE NOTE

- Do not extend the signal wire between an indoor unit and a relay kit beyond a 2 m cable supplied as an accessory.
- When you have to extend the signal wire between a relay kit and a branching controller, use the following cables. Please take heed of cable colors so that cables may maintain the consistent color scheme.

Signal wire	2.0/2.0 (mm ²) \times 5 (pieces)
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- Please connect the earth wire from a branching controller to an indoor unit and relay kit.
- Please fix a relay kit with 2 screws (to be procured on the installer's part) on the back of the ceiling or a wall in the proximity of an indoor unit.
- When installation work is completed, please check the above-mentioned points for any connection errors.

○ Appearance drawing of a relay kit



(b) Integrated branching controller

PCB012D026

1. BEFORE BEGINNING INSTALLATION

- ① Limitation on the number of branching controllers which can be connected to a outdoor unit is as follows.

Outdoor unit	Minimum number of units to be able to connect
~280	2 units
~560	4 units
~850	6 units
~1130	8 units
~1360	10 units

※For PFD112X4-E model, calculate the number of units taking 1 branching controller as 4 controllers in this limit.

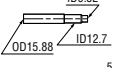
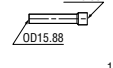
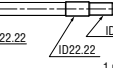
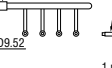




- ② Indoor units "should not be connected" to a branching controller, when they exceed a range specified for either combined total capacity or number in the table below.

Branching controller model	Total of four branches		Per branch	
	Capacity restrictions	Maximum number of units connectable	Capacity restrictions	Maximum number of units connectable
PFD1123X4-E	Less than 371	16 units	Less than 112	5 units (In this case, Five indoor units can only be operated in a mode.)

※When installing more than one indoor unit at the downstream from a branching controller, set it such a manner that all of them will be operated in the same cooling/heating mode, by either one of the following methods.

- Control of more than one indoor unit with one remote control unit ○ Same cooling/heating control in master/slave indoor unit (Refer to the installation manual of outdoor unit.)

- ③ Make sure that no accessory is missing.

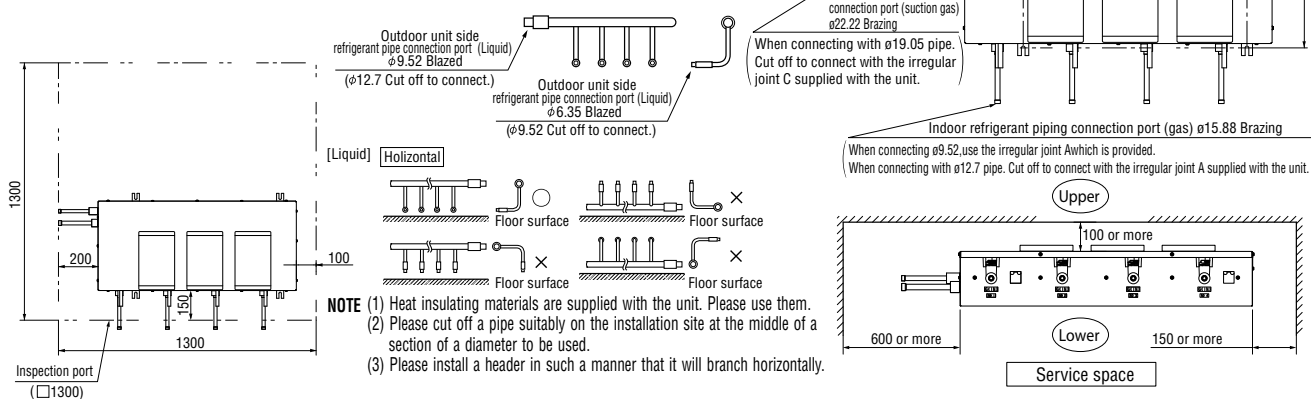
Different diameter pipe joint			Liquid side header	Heat insulation material		TY-RAP band	Relay kit
For outdoor unit suction gas piping	For outdoor unit discharge gas piping	For outdoor unit suction gas piping		Pipe cover	For liquid side header		
A 	B 	C 					

2. INSTALLATION OF A BRANCHING CONTROLLER

- ① Selecting the installation location

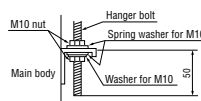
- A branching controller sometimes generates noises during control operations whether the system is in operation or stands still. When it is installed in a place with a low background noise level, please take appropriate precautions such as installing it away from the indoor unit.
- The position where you can install refrigerant pipes within the specified restrictions on length.
- The position where you can install hanger bolts and secure a required level of strength. (The position where pulling force of 20 kg per bolt is endured)
- The position where a service space conforming to the requirements shown in the drawing on the right can be secured.

PLEASE NOTE (1) Do not fail to provide an inspection port at the specified position.
(2) A branching controller cannot be installed upside down. Please install it in such a manner that the main body is held levelly.



- ② The positions of hanger bolts.

Use four M10 bolts for the hanging bolts. (to be procured from a local supplier)
Please fasten securely as illustrated in the drawing below.



When you install the main body, but you cannot position it properly to the opening of the ceiling, please adjust the position by moving it along a fixing metal's oblong hole.

- ③ Cautions when carrying a unit.

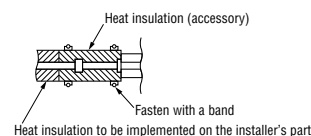
- In carrying the unit, please hold it by the hooks. Holding pipes can result in pipe deformation and a unit failure.
- Do not put your hand in the notch area for fear that you should get hurt.
- Since the unit is heavy (30kg), take care in handling it.

3. REFRIGERANT PIPING

- A branching controller has on its main body beneath the connection ports such indications as “S.G (OUT),” “D.G (OUT)” and “I.G (IN)” provided for the outdoor unit gas suction pipe, the outdoor unit gas discharge pipe and indoor unit gas pipes respectively, **so please make sure that you connect correct pipes to correct ports.**
- No liquid pipe needs to be connected to a branching controller.
- Pipes are to be brazed to connect to a branching controller.
- When brazing work, perform it while cool down around the brazing port with wet towels to prevent the overheating.
- After check the gas leak test, install the heat insulation (prepare on site) to the brazing port of the indoor unit.

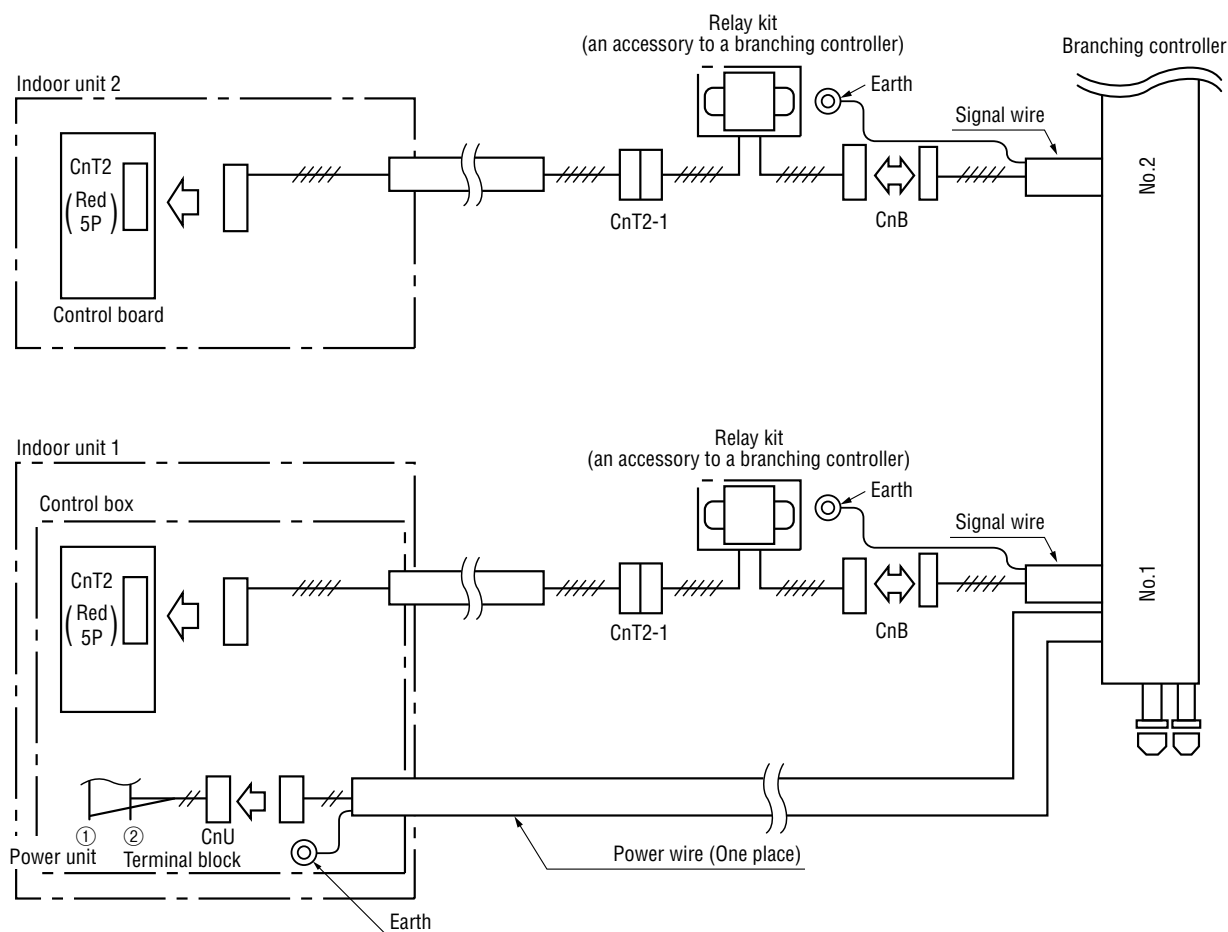
① Refrigerant pipe connection.

- Please heat-insulate a pipe connection with a pipe cover or a flange cover supplied with the unit without fail.



4. ELECTRICAL WIRING WORK

- Please implement cabling according to the instructions contained in the drawing below.



PLEASE NOTE

- (1) Please connect a signal wire from a relay kit to the connector of the same connection port number with the coolant pipe.
- (2) Please connect the power cable of a branching controller to the indoor unit's unit CnU. (at one place)
- (3) Do not extend the signal wire between an indoor unit and a relay kit beyond a 2 m cable supplied as an accessory.
- (4) To extend signal cables connecting between a relay kit and a branching controller and a power cable connecting between an indoor unit and a branching controller, please use the cables specified below. In extending these cables, make sure that the consistency of cable colors is maintained. (When you extend signal and power cables, do not forget to extend a grounding wire accordingly as well.)

Signal wire	2.0/2.0 (mm ²) × 5 (pieces)
Power wire	2.0/2.0 (mm ²) × 2 (pieces)

- (5) Please connect the earth wire from a branching controller to an indoor unit and relay kits.
- (6) Please fix a relay kit with 2 screws (to be procured on the installer's part) on the back of the ceiling or a wall in the proximity of an indoor unit.
- (7) When installation work is completed, please check the above-mentioned points for any connection errors.

○ Appearance drawing of a relay kit

